Enter the Following New Claims:

--12. The method according to claim 1, wherein the training sequence is a midamble.--

A4

13. The radio station according to claim 11, wherein at least one of said training sequences is a midamble.--

Remarks:

Reconsideration of the application is requested.

Claims 1 to 13 are now in the application. Claims 1, 2, 6, 7, 8, 10, and 11 have been amended. A marked-up version of the claims is attached hereto on separate pages. Claims 12 to 13 have been added.

In item 3 on pages 2 to 5 of the above-identified Office action, claims 1 to 6 and 9 to 11 have been rejected as being obvious over Ichihashi (U.S. 5,838,718) in view of Richardson (U.S. 5,905,962) and Chennakeshu et al. (U.S. 5,283,811; hereinafter "Chennakeshu") under 35 U.S.C. § 103.

The rejection has been noted and the claims have been amended in an effort to even more clearly define the invention of the instant application.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 1 calls for, *inter alia*, a method for data transmission via a radio interface in a radio communications system, which comprises the following steps:

> assigning one connection via a radio interface a given number of at least two data channels, whereby the data channels can be distinguished by an individual spread code;
>
> transmitting in the data channels data symbols and, in addition, training sequences with known symbols; and
>
> utilizing for at least two of the data channels of the connection one common training sequence different from training sequences of other connections.

The expression "midambles" in line 8 of claim 1 was replaced by "training sequence". The fact that the midambles are a training sequence can be found in the first paragraph of the specification on page 3 of the specification of the instant application. Furthermore, "a data channel" in claim 1 has been changed to "the data channels" for consistency. Furthermore, the last two lines of claim 1 have been cancelled and replaced with: "utilizing for at least two of the data

channels of the connection one common training sequence different from training sequences of other connections." The first part of this addition (i.e., the provision of a common midamble for several channels of the connection) can be found in the third paragraph on page 22 of the specification of the instant application. According to the second paragraph on page 11 of the specification of the instant application, the data channels DK1 and DK2 are two channels of the same connection. See FIG. 1. The second part of the addition to claim 1 (referring to the use of different training sequences or midambles for different connections) can be found in the last paragraph on page 17 of the specification of the instant application. Also seen from this paragraph is that a connection is assigned to each subscriber (as shown in FIG. 1). Claim 11 has been amended similarly.

In claims 1 and 11 as amended, the same training sequence/midamble is assigned to several channels of the same connection that differ from training sequences/midambles of other connections. Such a procedure is possible because the transmission path is the same for all of the data channels of the same connection and that a channel estimation carried out with the help of the midambles must, thus, not be carried out individually for each of the data channels that differs in individual spread codes. See the last paragraph on page 4 to the first paragraph on page 5 of the specification of the

instant application. For the estimation of the transmission channel it suffices to only use a single training frequency.

The Examiner has correctly determined that Ichihashi does not mention Midambles or training sequences. However, the assertion that Ichihashi has individual spread codes for differentiating the data channels is not correct. The spread codes mentioned in claims 1 and 11 of the instant application are used in the so-called direct sequence CDMA method. A spread code is a signal sequence with which every data symbol that is to be transmitted is spread so that the resulting signal to be transmitted is broadband. The spread spectrum frequency hopping method, as is also described in Ichihashi, differs from these direct sequence CDMA methods. There are no spread codes with which the data symbols that are to be transmitted are spread before a transmission. On the contrary, the carrier frequency is changed from time to time for the transmission of a signal. See, for example, Ichihashi at col. 10, lines 30 to 38. This text passage discloses that the frequency jumping takes place on time slots, while each slot obviously contains a multiplicity of data symbols. Due to the fact that Ichihashi does not mention training sequences or spread codes, as they are used in direct sequence spread spectrum methods, Ichihashi cannot suggest claims 1 or 11 of the instant application, even if Ichihashi is combined with Richardson and Chennakeshu.

Richardson describes a GSM mobile radio system. See Richardson at col. 4, line 20, col. 5, lines 28 to 40 as well as claims 7 and 19 therein. It can be seen from an excerpt from the book written by Mouly and Pautet "The GSM System for Mobile Communications", page 233, last paragraph, a copy of which is attached hereto, that different training sequences are provided in the GSM mobile radio system so that mutual interferences can be avoided, when channels are operated in the same frequency region clearly next to each other. In other words, this means that different training sequences are always used in a time slot GSM system in the same frequency band, if one is within a radio cell. Such is the case in claims 1 and 11. Specifically, several data channels are assigned to the same connection so that all of these data channels exist between the same base station and the same subscriber. The use of spread codes in the direct sequence CDMA method furthermore leads to the generation of broadband transmission signals which, thus, overlap in the same broad frequency band.

Based upon the above, one having ordinary skill in the art would never get to the object of claims 1 or 11 by combining of Ichihashi and Richardson because, in contrast to claims 1 and 11 of the instant application, that person would be taught

to provide the same connection of different midambles for all of the data channels.

The analysis for Richardson also holds true for Chennakeshu, because Chennakeshu also pertains to a TDMA method (see col. 1, lines 33 to 42) in which an individual synchronization word or a preamble is assigned to each time slot, which is also a training sequence. See Chennakeshu at col. 11, lines 10 to 12.

It is well settled that almost all claimed inventions are but novel combinations of old features. The courts have held in this context, however, that when "it is necessary to select elements of various teachings in order to form the claimed invention, we ascertain whether there is any suggestion or motivation **in the prior art** to make the selection made by the applicant". Interconnect Planning Corp. v. Feil, 227 USPQ 543, 551 (Fed. Cir. 1985) (emphasis added). "Obviousness can not be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination". In re Bond, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). "Under Section 103 teachings of references can be combined **only** if there is some suggestion or incentive to do so." ACS Hospital Systems, Inc. v. Montefiore Hospital et al., 221 USPQ 929, 933, 732 F.2d 1572 (Fed. Cir. 1984) (emphasis original). "Although a

reference need not expressly teach that the disclosure contained therein should be combined with another, the showing of combinability, in whatever form, must nevertheless be '**clear and particular**.'" Winner Int'l Royalty Corp. v. Wang, 53 USPQ2d 1580, 1587, 202 F.3d 1340 (Fed. Cir. 2000) (emphasis added; citations omitted); Brown & Williamson Tobacco Corp. v. Philip Morris, Inc., 56 USPQ2d 1456, 1459 (Fed. Cir. Oct. 17, 2000). Applicants believe that there is no "clear and particular" teaching or suggestion in Ichihashi to incorporate the features of Richardson and Chennakeshu, and there is no teaching or suggestion in Richardson and Chennakeshu to incorporate the features of Ichihashi.

In establishing a *prima facie* case of obviousness, it is incumbent upon the Examiner to provide a reason why one of ordinary skill in the art would have been led to modify a prior art reference or to combine reference teachings to arrive at the claimed invention. Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Int. 1985). To this end, the requisite motivation must stem from some teaching, suggestion, or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from the *applicants'* disclosure. See, for example, Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1052, 5 USPQ2d 1434, 1439 (Fed. Cir. 1988), *cert. den.*, 488 U.S. 825 (1988). The Examiner has not provided the requisite reason

why one of ordinary skill in the art would have been led to modify Ichihashi or Richardson or Chennakeshu or to combine Ichihashi's or Richardson's or Chennakeshu's teachings to arrive at the claimed invention. Further, the Examiner has not shown the requisite motivation from some teaching, suggestion, or inference in Ichihashi or Richardson or Chennakeshu or from knowledge available to those skilled in the art.

Applicants respectfully believe that any teaching, suggestion, or incentive possibly derived from the prior art is only present with hindsight judgment in view of the instant application. "It is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selecting elements from references to fill the gaps. . . . The references **themselves** must provide some teaching whereby the applicant's combination would have been obvious." In re Gorman, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991) (emphasis added). Here, no such teaching is present in the cited references.

Clearly, none of the cited prior art references give any reason to a person of skill in the art to provide a common midamble for a part of the data channels, as set forth in claims 1 or 11 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claims 1 or 11. Claims 1 and 11 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claims 1 or 11.

Insofar as claims 7 and 8 are ultimately dependent upon claim 1, and due to the fact that claim 1 is believed to be allowable, these dependent claims are believed to be allowable as well. Thus, the rejection of claims 7 and 8 in item 4 on pages 5 to 6 of the Office action under Section 103 is now moot.

Applicants have added new claims 12 and 13 dependent upon claims 1 and 11, respectively. No new matter has been added.

In view of the foregoing, reconsideration and allowance of claims 1 to 13 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

Please charge any fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

For Applicants

Gregory L. Mayback
Reg. No. 40,719

GLM:cgm

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Lerner and Greenberg, P.A.
Post Office Box 2480
Hollywood, FL 33022-2480
Tel: (954) 925-1100
Fax: (954) 925-1101

Version of Claims With Markings to Show Changes Made:

Claim 1 (amended). A method for data transmission via a radio interface in a radio communications system, which comprises the following steps:

assigning one connection via a radio interface a given number of at least two data channels, whereby the data channels can be distinguished by an individual spread code;

transmitting in [a] the data [channel] channels data symbols and, in addition, [midambles] training sequences with known symbols; and

[wherein a number of midambles used for the connection is less than the given number of data channels] utilizing for at least two of the data channels of the connection one common training sequence different from training sequences of other connections.

Claim 2 (amended). The method according to claim 1, which comprises using one [midamble] common training sequence for all of the data channels of the connection.

Claim 6 (amended). The method according to claim 1, wherein a ratio of a mean power per symbol between the [midambles] training sequences and the data symbols is variable.

Claim 7 (amended). The method according to claim 1, which comprises evaluating the [midambles] <u>training sequences</u> for channel estimation at a receiving end, with a length of an estimated channel impulse response being variable.

Claim 8 (amended). The method according to claim 1, which comprises evaluating the [midambles] <u>training sequences</u> for channel estimation at a receiving end, with a length of the [midambles] <u>training sequences</u> being variable.

Claim 10 (amended). The method according to claim 1, wherein the radio interface includes a TDMA component, so that a finite burst comprising the [midambles] <u>training sequences</u> and data symbols is transmitted in a respective time slot, and which further comprises basing an assignment strategy for connections to a time slot on a number of [midambles] <u>training sequences</u> to be estimated per time slot.

Claim 11 (amended). A radio station for data transmission in a radio communications system via a radio interface, comprising:

a control device for assigning at least two data channels to a connection in a radio communications system;

wherein each data channel can be distinguished by an individual spread code, and

wherein data symbols and, in addition, [midambles] training sequences with known symbols are transmitted in a data channel;

a signal processor using [a number of midambles for the connection, whereby the number of midambles is less than a number of data channels] for at least two of the data channels of the connection one common training sequence different from training sequences of other connections.

The GSM System for Mobile Communications

M hel MOUL

Mac

This book is published by the authors. Correspondence, in particular for orders, but also for comments, should be mailed to:

M. MOULY et Marie-B. PAUTET
49, rue Louise Bruneau
F-91120 PALAISEAU
FRANCE

Telephone : +33 1 69 31 03 18
Facsimile : +33 1 69 31 03 38

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This book would not exist if a group of European people had not taken a common aim and worked hard together to reach it. This book is dedicated to all these mothers and fathers of GSM.

position of the useful signal inside a reception window, and to have an idea of the distortion caused by transmission. These information are of prime importance to obtain good demodulation performances.

Several burst formats are defined:

- the access burst is only used in the uplink direction during initial phases when the propagation delay between the mobile station and the base station is not yet known. This is the case with the first access of a mobile station on the RACH, or sometimes with the access of a mobile station to a new cell upon handover. The access burst is a short burst: it is the only kind of burst used on the RACH;
- the F and S bursts are used respectively on the FCCH and on the SCH. They serve solely for initial synchronisation acquisition of a mobile station in a given cell.
- the normal burst is a long burst used in all other cases.

4.3.1.1. The Normal Burst

A normal burst contains two packets of 58 bits surrounding a training sequence of 26 bits (see table 4.3). Three "tail" bits (set to 0) are added on each side.

The Specifications also include the guard time in the burst. The actual guard time is determined by the signal envelope (see figure 4.23). If we only consider the guard time as the period during which the signal is below −70 dB, its duration is about 30 µs. In the uplink direction, this guard time is barely enough to compensate for equipment inaccuracies and for multipath echoes if they are spread on the maximum range allowed by demodulation. The propagation delay itself is compensated by the timing advance mechanism (see Chapter 6 for this topic). In the downlink direction, the guard time could have been chosen shorter, but it has been kept at the same value for symmetry reasons.

Tail	Information	Training Sequence	Information	Tail
3	58	26	58	3

Table 4.3 – Contents of a normal burst

116 information bits are spread on both sides of a midamble, or training sequence, of 26 bits.

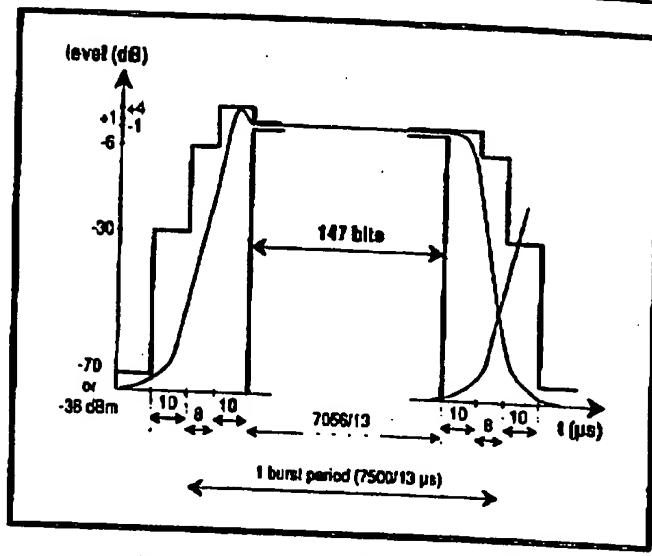

Figure 4.23 – Amplitude profile of a "normal" burst

The time mask of a normal burst is specified with a constant amplitude during the "useful part" of the burst and power ramping at both ends. The power level during the guard time should not exceed 10^{-7} (-70 dB) of the "useful part" level, or $10^{-6.6}$ W (-36 dBm), whichever the highest.

The training sequence has been inserted in the middle of the burst in order to minimise its maximum distance with a useful bit, and is therefore sometimes called [redacted]' (it has the same role as a preamble, but is in the middle of the burst). The only drawback of that position is the need for the receiver to memorise the first portion of the burst before being able to demodulate it, but this is a very mild constraint compared to the benefit gained from it.

Eight different training sequences have been specified. Why not a single one? Let us consider the case of two similar interfering signals arriving at the receiver at almost the same time. If their training sequences are the same, there is no way to distinguish the contribution of each of them to the received signal. The situation is much clearer when the two training sequences differ, and are as little correlated as possible. Distinct training sequences will therefore be allocated to channels using the same frequencies in cells which are close enough to interfere with one another.